through a wire-mesh strainer enters the steam chest supplying the second-stage nozzles, and also through an auxiliary steam pipe to the steam chest of the first-stage nozzles. The air connection to the condenser is by branch D, and the steam and air are discharged at E, and may be sent into the feed-water suction tank for the recovery of most of the heat in the injector steam. The ejector is capable of discharging against a back pressure of from 14 to 16 ft. of water.

The steam nozzles are arranged in multiple form to obtain the highest possible entraining action between the flowing steam and the air. The first-stage nozzles use only a small proportion of the operating steam, about one-twentieth. The object of this set is to start in motion the air and gases, and to deliver the entire mass into the main nozzles at a high velocity. This enables the second set to increase the velocity and momentum of the stream of air to such an extent as to discharge the stream against the external pressure. The diffuser, being designed to deal with a greater amount of air than normally leaks into the main condenser, does not work well when dealing only with small amounts of air. To ensure greater stability of operation, some leakage of air from the atmosphere into the throat of the cliffuser is allowed. This leakage reduces automatically should there be an abnormal amount of air coming from the main condenser.

CHAPTER III

Water Cooling and Cooling Towers

Water Cooling.—The calculations on pp. 221 and 231 will have shown what a large amount of water is necessary for condensing purposes, particularly when high vacua are required. The availability of cooling or condensing water often determines the site of the power house or station, for if it can be placed where there is little or no danger of failure of the water-supply, the problem of providing the water is greatly simplified. Frequently there is no natural or cheap supply of water

available in quantity at all seasons, and some system of cooling must be adopted. There are three methods in common use for this purpose, viz. the pond or reservoir, the sprayer, and the tower. These arrangements will be considered later in detail.

Whatever the system of cooling adopted, the principal cooling action depended upon is the absorption of vapour, and the equivalent latent heat, from the surfaces of the water by the atmosphere or air in contact with or near to these surfaces. The heat thereby taken up is obtained at the expense of heat in the water remaining, which cools in consequence. The amount of vapour contained in air saturated at any particular temperature may be calculated in the manner given on p. 237, and the corresponding amount of heat is easily estimated. The results of such calculations per pound of air at atmospheric pressure are shown in fig. 29, and it would be noted how